

NASA SBIR/STTR Technologies

E1.03-8501 - Zero G Mass Measurement Device (ZGMMD)



PI: Robert Richter
Orbital Technologies Corporation - Madison, WI

Identification and Significance of Innovation

The Zero G Mass Measurement Device (ZGMMD) will provide the ability to quantify the mass of objects up to 2,000 grams, including live animal specimens. This will be accomplished using subtle accelerations accomplished with accurate actuation/sensing of the object/specimen, for proper determination of the mass. Capabilities for internal calibration will also be provided.

The significance of this innovation is that currently there are no mass measurement devices available in the ISS that can accurately measure the mass of objects that have a relatively low mass, or may be sensitive to accelerations, such as animal specimens. The ZGMMD would provide the capability to quantify the fundamental mass data, and provide both a user interface, as well as a networked interface. This device would be capable of being used in the Microgravity Sciences Glovebox (MSG) or could be integrated with scientific payloads.



Estimated TRL at beginning and end of contract: (Begin: 2 End: 4)

Technical Objectives and Work Plan

The technical objectives for the Phase I effort:

- Identify required accuracy for science utilization in Zero-G
- Identify required sensing/actuation accuracies needed for
- Identify source for generation necessary actuation
- Identify pertinent interfaces for communicating data

The work plan has the following tasks:

1. Determine science requirements for biological specimens
2. Design/develop modular interface for specimen location
3. Design/develop actuation/sensing capabilities
4. Design/develop algorithms/methods for increased accuracy
5. Design/develop preliminary user/data interface
6. Develop design and plan for implementation during Phase II

NASA Applications

Zero G mass measurement science instrument has the ability to be used in many applications aboard the ISS, including measuring the mass of:

- Animals
- Plants
- Fluids
- ISRU Products
- Crystals

Non-NASA Applications

- Use for commercial, non-NASA flights conducting science
- Commercial applications which require steady altered gravity

Firm Contacts Thomas Crabb
Orbital Technologies Corporation
Space Center, 1212 Fourier Drive
Madison, WI, 53717-1961
PHONE: (608) 827-5000
FAX: (608) 827-5050

NON-PROPRIETARY DATA